REMARKS

I. Status of Claims

Initially, applicants wish to thank the Patent Office for entering the previously filed Amendment After Final Rejection, for considering applicants' amendments and remarks, and for withdrawing the finality of the previous Official Action.

Claims 20-41 are pending in the present application and are under consideration. Claims 20 and 30-41 remain rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 20-41 remain rejected under 35 U.S.C. §112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 20-41 stand rejected under 35 U.S.C. §101 as not supported by a specific, substantial or well established utility.

Claims 20-41 stand rejected under 35 U.S.C. §112, first paragraph, as not asserting a specific or substantial utility and therefore, the Patent Office contends, one skilled in the art would not be able to make and use the claimed invention.

Lastly, claims 24 and 26 stand rejected under 35 U.S.C. §112, second paragraph as indefinite.

II. Response to the Rejection of Claims 20 and 30-41 Under 35 U.S.C. §112, First Paragraph, Written Description Requirement

After considering applicants' arguments, the Patent Office has maintained its rejection of claims 20 and 30-41 under 35 U.S.C. §112, first paragraph, as not complying with the written description requirement of the statute. It remains the Patent Office's position that "the specification does not adequately describe the relevant identifying characteristics of the genus of nucleic acids that hybridize to, or have 70% identity with a disclosed polynucleotide and has the disclosed function." *Official Action*, page 3-4.

Applicants respectfully acknowledge the Patent Office's consideration of the arguments presented in applicants' previously filed Amendment After Final Rejection. Applicants remain of the position that the rejected claims meet the written description requirement of 35 U.S.C. §112, first paragraph. However, solely in order to advance prosecution, applicants have canceled claims 30 and 38. Accordingly, applicants respectfully request that the rejection of claims 20, 31-37 and 39-41 under 35 U.S.C. §112, first paragraph, as not complying with the written description requirement be withdrawn.

III. Response to the Rejection of Claims 20-41 Under 35 U.S.C. §112, First Paragraph, Enablement Requirement

After considering applicants' arguments, the Patent Office has maintained its rejection of claims 20 and 30-41 under 35 U.S.C. §112, first paragraph, as lacking enabling disclosure. It is the Patent Office's position that one of ordinary skill in the art would not be able to use the claimed invention without engaging in undue experimentation. Having carefully considered the Patent Office's arguments, applicants traverse the rejection and submit the following comments.

Applicants respectfully acknowledge the Patent Office's consideration of applicants' arguments related to the homology data presented in the specification. Nevertheless, applicants remain of the position that the function of the claimed sequence has been established by the homology of the claimed sequence with the sequences presented in the specification, as well as by other data reported in the Examples, and reiterate their previous arguments. Summarily, it remains applicants' position, that the data presented in the specification adequately describes a function for the claimed sequences, and that the claims fully meet the enablement requirements of 35 U.S.C. §112, first paragraph.

Applicants also respectfully disagree with the Patent Office's position that one of ordinary skill in the art would need to engage in undue experimentation to practice the invention as claimed, for example in assays and to treat diseases. Applicants reiterate their arguments presented in the previous response and submit the following.

The Patent Office states "the disclosure provides no suggestion of what the assays might be used for other than to further characterize the claimed nucleic acid or to diagnose or treat some unspecified disease." *Official Action*, page 6. Applicants again note, however, that an extensive list of specific diseases and conditions are provided in the specification, some of which

the Patent Office recites in the Action. These diseases and conditions are discussed by specific name, and are not presented as generalized states.

The Patent Office states applicants' argument "fail to appreciate the amount of experimentation that would be required to use the claimed nucleic acids for any of these purposes even if one were to assume that the nucleic acid has the asserted function." *Official Action*, pages 6-7. Applicants remain of the position that any experimentation that might or might not be required in the diagnosis and/or treatment of the specific diseases described in the specification would be merely routine in nature. Routine experimentation, regardless of the amount, does not render a claim incompliant with 35 U.S.C. §112, first paragraph ("The test is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the U.S. patent application in question provides a reasonable amount of guidance with respect to the direction in which experimentation should proceed." *In re Wands*, 8 U.S.P.Q.2d at 1404 (citing *In re Angstadt*, 190 U.S.P.Q. 214, 218 (C.C.P.A. 1976))). Thus, applicants maintain the position that in view of the guidance provided in the present disclosure, one of ordinary skill in the art would readily be able to develop a diagnostic protocol and/or a therapeutic, as claimed. Applicants submit that any guidance needed for such experimentation, to the extent any such guidance beyond the knowledge of one of ordinary skill in the art would be required, is provided in the specification and/or would be known to one of ordinary skill in the art, since nothing beyond established scientific techniques and principals need to be employed in the present invention.

The Patent Office also argues that the disclosure "provides only tenuous evidence that the disclosed nucleic acid might encode a part of a potassium channel and suggests some diseases in which potassium channel dysfunction might play a role." *Official Action*, page 7. Applicants resubmit that in view of the data provided in the specification, including the homology data and the *Drosophila* data discussed in the previous Response, one of ordinary skill in the art, could use the present invention, as claimed, without engaging in undue experimentation. It is applicants' position that this data certainly represents more than "tenuous evidence." Applicants reiterate their earlier arguments that in view of the level of skill in the art, a researcher using no more than the instant disclosure as a guide, coupled with what is known in the art and routine optimization protocols, could practice the claimed invention. Summarily, applicants submit that the function of the claimed sequence is adequately established, as argued previously.

The Patent Office's arguments related to the CLUSTALW alignment recited in claim 38 are rendered moot by applicants' cancellation of claim 38.

In view of the above, applicants submit that claims 20-41 are in full compliance with 35 U.S.C. §112, first paragraph, and respectfully request that the rejection of record be withdrawn.

IV. Response to the Double Patenting Advisory

The Patent Office has advised applicants that "should claim 35 be found allowable, claim 39 will be objected to under 37 C.F.R. §1.75 as being a substantial duplicate thereof."

In an effort to expedite prosecution, applicants have canceled claim 39.

V. Response to the Rejection of Claims 20-41 Under 35 U.S.C. §101

The Patent Office rejected claims 20-41 under 35 U.S.C. §101 as lacking a specific, substantial or well established utility. More particularly, the Patent Office contends applicants' asserted utility of treating, diagnosing and/or preventing diseases, disorders and conditions is not specific, substantial or well established. Applicants traverse the rejection and submit the following comments.

The Patent Office contends applicants have not provided a specific disease, disorder or condition that can be diagnosed, prognosed or treated using the claimed sequences. Applicants respond by directing attention to page 20, line 36, through page 21, line 8, of the Specification, wherein applicants state: "[b]ased on the expression pattern of this novel sequence, diseases that can be treated with agonists and/or antagonists for K+betaM6 including, but not limited to, epilepsy, Bartter's syndrome, persistent hyperinsulinemic hypoglycemia of infancy, hyperkalemia and hypokalemia, cystic fibrosis and hypercalciuric nephrolithiasis." Applicants also direct attention to page 22, line 22-24 of the specification, wherein applicants state that in view of the association of the claimed sequence with the NFkB pathway, "antagonists of K+betaM6 may be useful in the treatment of inflammatory diseases including rheumatoid arthritis, asthma, multiple sclerosis, osteoarthritis, among others." The above specific diseases are only representative, and additional diseases and conditions in which the claimed sequence may play a role are provided in the Specification. Thus, contrary to the Patent Office's assertion, the specification does, in fact, disclose specific disorders associated with altered levels of the K+betaM3 gene.

Continuing, applicants again direct attention to Example 6 (pages 215-220), wherein applicants demonstrate an association of the claimed sequence with the NFκB pathway. This was accomplished by identifying a *Drosophila* orthologue of the claimed sequence, silencing the identified orthologue and determining the effect of the knockout. The results of these experiments indicate that the *Drosophila* orthologue is involved in the regulation of the *Drosophila* innate immune response. Based on the degree of identity/similarity between the *Drosophila* orthologue and the claimed K+betaM3 sequence, the claimed sequence is likely to have a function is the modulation of one or more mammalian immune pathways. In view of these results, applicants submit, therefore, that the Specification provides yet further specific diseases and conditions (e.g., immune pathway diseases and conditions) associated with altered levels of the claimed sequences.

Applicants also assert that the recited utility is substantial. Applicants submit that this asserted utility is presented in a form in which it can be employed in a real-world sense. The specification provides guidance in this regard by indicating various conditions in which modulation of the expression of the claimed sequence can be employed to diagnose, treat and/or prevent, as well as guidance in how to achieve the desired results such as that provided in the specification.

Applicants also disagree with the Patent Office's conclusion that significant experimentation would be required to identify individuals with such a disease. Applicants submit that any such experimentation, if in fact any experimentation would be required, would be simply routine. Applicants submit that a "real world" context is already established and no further experimentation is required in this regard.

Generally, it is the Patent Office's position that applicants have not established that the claimed sequences encode a novel potassium channel beta subunit. Applicants again rely on the homology and other data provided in the specification. In support of its rejection under 35 U.S.C. §101, the Patent Office again presents arguments to the effect that applicants' conclusion regarding the identity of the claimed sequence as a novel potassium channel subunit is inaccurate and/or unsupported. Particularly, the Patent Office cites several references in support of its position that applicants' characterization of the claimed sequence by homology is untenable. In response, applicants reiterate their arguments presented herein above and in their previous responses. Summarily, applicants contend that one of ordinary skill in the art, even in view of

the cited references, would still conclude the claimed sequence is a novel potassium channel subunit, as applicants have characterized the sequence. Applicants again submit the 37.5% similarity between the Maxi-K potassium channel beta subunit and the claimed sequence supports applicants' contention. Applicants submit that the additional homology data provided in the specification (homology with, e.g., human potassium channel K+Hnov27 protein, human potassium channel K+Hnov28 protein and human KIAA1317 protein and *C. elegans* and *Drosophila* sequences) further supports applicants characterization of the claimed sequences human potassium channel K+Hnov27 protein, human potassium channel K+Hnov28 protein and human KIAA1317 protein, as well as for several *C. elegans* and *Drosophila* sequences.

In view of the above, Applicants submit that each of the utilities provided in the specification, including those identified by the Patent Office, are specific, substantial and credible. Applicants further submit that the characterization data provided in the specification offers support sufficient that one of ordinary skill in the art would not doubt the asserted utilities, including therapeutic regimens and modulator identification. Accordingly, applicants respectfully request that the rejection of claims 21-40 under 35 U.S.C. §101 be reconsidered and withdrawn.

VI. Response to the Rejection of Claims 20-41 under 35 USC 112, First Paragraph, Enablement

In view of its rejection of claims 20-41 under 35 U.S.C. §101, the Patent Office rejected claims 20-41 under 35 U.S.C. §112, first paragraph, as being unsupported by a specific or substantial asserted utility or a well established utility. The Patent Office then contends one skilled in the art would not know how to make and use the claimed invention. Applicants traverse the rejection and submit the following comments.

Applicants reiterate the arguments presented above in the connection with the Patent Office's rejection of claims 21-40 under 35 U.S.C. §101. For the reasons discussed above, applicants maintain that at least one specific, substantial and credible utility has been presented. Accordingly, applicants submit that in view of the presented utility, as well as the extensive disclosure presented in the specification, one of ordinary skill in the art would readily be able to make and use the invention as claimed. Accordingly, in view of applicants' assertion of at least one specific, substantial and credible utility, applicants request that the rejection of claims 20-41 under 35 U.S.C. §112, first paragraph, be withdrawn.

VII. Response to the Rejection of Claims 24 and 26 Under 35 U.S.C. §112, Second Paragraph

The Patent Office rejected claims 24 and 26 under 35 U.S.C. §112, second paragraph. The Patent Office states the claims recite open claim language, but depend from claims reciting "consisting of" language. The Patent Office indicates that amending claims 24 and 26 to recite "consisting of" rather than "comprising" would be remedial.

Applicants have amended claims 24 and 26 accordingly and submit these claim amendments render the rejection of these claims under 35 U.S.C. §112, second paragraph, moot.

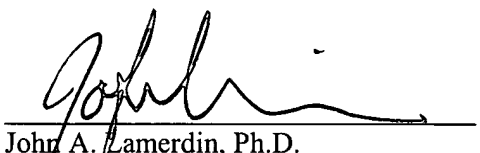
VIII. Conclusions

In light of the above amendments and remarks, applicants submit that the subject patent application is in condition for allowance and courteously solicit a Notice of Allowance.

If any small matter should remain outstanding after the Patent Examiner has had an opportunity to review the above Remarks, the Patent Examiner is respectfully requested to telephone the undersigned patent attorney in order to resolve these matters and avoid the issuance of another Official Action.

Although it is believed no fee associated with the filing of the present correspondence is due, the Commissioner is hereby authorized to charge any deficiency or credit any overpayment associated with the filing of this correspondence to Deposit Account Number 19-3880.

Respectfully submitted,



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Date: December 22, 2003